



SEQUENCE LISTING

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<110> GORING, Daphne R. et al.

<120> PROLINE-RICH EXTENSIN-LIKE RECEPTOR KINASES

<130> P 25,762-A USA

<140> US 10/086,464

<141> 2002-02-28

<150> US 10/069,304

<151> 2002-02-19

<150> PCT/CA00/00966

<151> 2000-08-18

<150> US 60/149,466

<151> 1999-08-19

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<170> PatentIn Ver. 2.1

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| Thr | Thr | Pro | Ser | Ser | Pro | Pro | Pro | Pro | Ser | Thr | Ile | Pro | Thr | Ser | Pro | |
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3/10/02

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| Thr Pro Ser Thr Pro Gly Ser Pro Pro Pro Leu Pro Gln Pro Ser Pro | |
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| Pro Ala Pro Thr Thr Pro Gly Ser Pro Pro Ala Pro Val Thr Pro Pro | |
| 85 90 95 | |
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| Thr Arg Asn Pro Pro Pro Ser Val Pro Gly Pro Pro Ser Asn Pro Ser | |
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| Lys Lys Lys Arg Arg Arg Asp Glu Glu Asp Ala Tyr Tyr Val Pro Pro | |
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| Pro Pro Pro Pro Gly Pro Lys Ala Gly Gly Pro Tyr Gly Gly Gln Gln | |
| 180 185 190 | |
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| Gln Gln Trp Arg Gln Gln Asn Ala Thr Pro Pro Ser Asp His Val Val | |
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| Thr Ser Leu Pro Pro Pro Pro Lys Ala Pro Ser Pro Pro Arg Gln Pro | |
| 210 215 220 | |
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| Pro Pro Pro Pro Pro Pro Pro Phe Met Ser Ser Ser Ser Gly Gly Ser Asp | |
| 225 230 235 240 | |
| tac tcg gac cgt cca gtt ctt cct cca ccg tct cca ggg ctt gtg tta | 768 |
| Tyr Ser Asp Arg Pro Val Leu Pro Pro Pro Ser Pro Gly Leu Val Leu | |
| 245 250 255 | |
| ggc ttc tcc aaa agc act ttc aca tac gag gag cta gct aga gcc acc | 816 |
| Gly Phe Ser Lys Ser Thr Phe Thr Tyr Glu Glu Leu Ala Arg Ala Thr | |
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| 275 | | | | | 280 | | | | | 285 | | | | | | |
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| gtg | cac | aaa | ggt | gtg | ttg | cct | agt | ggg | aaa | gaa | gtt | gct | gtg | aag | cag | 912 |
| Val | His | Lys | Gly | Val | Leu | Pro | Ser | Gly | Lys | Glu | Val | Ala | Val | Lys | Gln | |
| 290 | | | | 295 | | | | 300 | | | | | | | | |
| ttg | aaa | ggt | ggg | agt | ggt | cag | gga | gag | agg | gag | ttt | cag | gca | gag | ggt | 960 |
| Leu | Lys | Val | Gly | Ser | Gly | Gln | Gly | Glu | Arg | Glu | Phe | Gln | Ala | Glu | Val | |
| 305 | | | 310 | | | | 315 | | | | | | | | 320 | |
| gag | atc | atc | agc | aga | ggt | cac | cac | agg | cat | ctg | gtg | tct | ctt | ggt | ggt | 1008 |
| Glu | Ile | Ile | Ser | Arg | Val | His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly | |
| | | 325 | | | | 330 | | | | | | | | 335 | | |
| tat | tgc | atc | gcc | ggt | gcc | aaa | aga | ttg | ctt | gtc | tat | gag | ttt | ggt | cct | 1056 |
| Tyr | Cys | Ile | Ala | Gly | Ala | Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | Val | Pro | |
| | | 340 | | | | 345 | | | | | | | | 350 | | |
| aac | aac | aat | ctc | gag | ctt | cac | ctc | cat | ggc | gag | gga | cgg | cct | aca | atg | 1104 |
| Asn | Asn | Asn | Leu | Glu | Leu | His | Leu | His | Gly | Glu | Gly | Arg | Pro | Thr | Met | |
| 355 | | | | 360 | | | | 365 | | | | | | | | |
| gaa | tgg | agc | acc | aga | ttg | aag | att | gct | ctt | gga | tct | gct | aaa | gga | ctt | 1152 |
| Glu | Trp | Ser | Thr | Arg | Leu | Lys | Ile | Ala | Leu | Gly | Ser | Ala | Lys | Gly | Leu | |
| 370 | | | 375 | | | | 380 | | | | | | | | | |
| tct | tat | ctt | cat | gaa | gat | tgc | aat | cct | aaa | atc | att | cac | cgt | gat | atc | 1200 |
| Ser | Tyr | Leu | His | Glu | Asp | Cys | Asn | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile | |
| 385 | | | 390 | | | | 395 | | | | | | | | 400 | |
| aag | gct | tca | aac | ata | ttg | ata | gat | ttc | aag | ttt | gaa | gct | aag | ggt | gct | 1248 |
| Lys | Ala | Ser | Asn | Ile | Leu | Ile | Asp | Phe | Lys | Phe | Glu | Ala | Lys | Val | Ala | |
| | | 405 | | | | 410 | | | | | | | | 415 | | |
| gat | ttt | ggt | ctt | gct | aag | att | gct | tct | gat | aca | aac | acg | cat | gta | tca | 1296 |
| Asp | Phe | Gly | Leu | Ala | Lys | Ile | Ala | Ser | Asp | Thr | Asn | Thr | His | Val | Ser | |
| | | 420 | | | | 425 | | | | | | | | 430 | | |
| aca | cgt | gtg | atg | gga | acc | ttt | ggg | tac | ttg | gct | ccg | gaa | tac | gct | gca | 1344 |
| Thr | Arg | Val | Met | Gly | Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ala | |
| 435 | | | | 440 | | | | 445 | | | | | | | | |
| agc | gga | aag | ctc | acg | gag | aag | tct | gac | ggt | ttc | tca | ttt | ggc | ggt | gtg | 1392 |
| Ser | Gly | Lys | Leu | Thr | Glu | Lys | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val | |
| 450 | | | | 455 | | | | 460 | | | | | | | | |
| ctt | ttg | gag | ctc | att | act | gga | cgt | cga | ccc | ggt | gat | gcc | aac | aat | gtc | 1440 |
| Leu | Leu | Glu | Leu | Ile | Thr | Gly | Arg | Arg | Pro | Val | Asp | Ala | Asn | Asn | Val | |
| 465 | | | 470 | | | | 475 | | | | | | | | 480 | |
| tat | gta | gat | gac | agc | tta | ggt | gac | tgg | gca | cga | cca | ttg | ctt | aac | cga | 1488 |
| Tyr | Val | Asp | Asp | Ser | Leu | Val | Asp | Trp | Ala | Arg | Pro | Leu | Leu | Asn | Arg | |
| | | 485 | | | | 490 | | | | | | | | 495 | | |

| | |
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| Ala Ser Glu Gln Gly Asp Phe Glu Gly Leu Ala Asp Ala Lys Met Asn | |
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| aat ggg tat gac aga gag gag atg gct cgc atg gtt gct tgt gct gcg | 1584 |
| Asn Gly Tyr Asp Arg Glu Glu Met Ala Arg Met Val Ala Cys Ala Ala | |
| 515 520 525 | |
| gct tgt gtt cgc cat tca gct cgc cgc aga cct cgc atg agc cag att | 1632 |
| Ala Cys Val Arg His Ser Ala Arg Arg Arg Pro Arg Met Ser Gln Ile | |
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| gtg cgt gcg tta gaa gga aat gta tca ctg tca gat ctt aac gaa ggg | 1680 |
| Val Arg Ala Leu Glu Gly Asn Val Ser Leu Ser Asp Leu Asn Glu Gly | |
| 545 550 555 560 | |
| atg aga cca ggt caa agc aat gta tac agc tca tac gga gga agc acc | 1728 |
| Met Arg Pro Gly Gln Ser Asn Val Tyr Ser Ser Tyr Gly Gly Ser Thr | |
| 565 570 575 | |
| gat tat gac tcg agc cag tac aat gaa gac atg aag aag ttt agg aaa | 1776 |
| Asp Tyr Asp Ser Ser Gln Tyr Asn Glu Asp Met Lys Lys Phe Arg Lys | |
| 580 585 590 | |
| atg gca ctt gga act caa gag tac aac gcc acg ggt gag tac agt aat | 1824 |
| Met Ala Leu Gly Thr Gln Glu Tyr Asn Ala Thr Gly Glu Tyr Ser Asn | |
| 595 600 605 | |
| ccg acc agt gac tat gga ctg tac ccg tct ggt tca agc agc gag ggc | 1872 |
| Pro Thr Ser Asp Tyr Gly Leu Tyr Pro Ser Gly Ser Ser Ser Glu Gly | |
| 610 615 620 | |
| caa acc aca cgc gaa atg gag atg ggg aag att aag aga acc ggt cag | 1920 |
| Gln Thr Thr Arg Glu Met Glu Met Gly Lys Ile Lys Arg Thr Gly Gln | |
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| 35 40 45 | |
| Pro Pro Ser Ser Arg Ser Thr Pro Ser Ala Pro Pro Pro Ser Pro Pro | |
| 50 55 60 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Pro | Ser | Thr | Pro | Gly | Ser | Pro | Pro | Pro | Leu | Pro | Gln | Pro | Ser | Pro |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Pro | Ala | Pro | Thr | Thr | Pro | Gly | Ser | Pro | Pro | Ala | Pro | Val | Thr | Pro | Pro |
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| Thr | Arg | Asn | Pro | Pro | Pro | Ser | Val | Pro | Gly | Pro | Pro | Ser | Asn | Pro | Ser |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Arg | Glu | Gly | Gly | Ser | Pro | Arg | Pro | Pro | Ser | Ser | Pro | Ser | Pro | Pro | Ser |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Pro | Ser | Ser | Asp | Gly | Leu | Ser | Thr | Gly | Val | Val | Val | Gly | Ile | Ala | Ile |
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| Gly | Gly | Val | Ala | Leu | Leu | Val | Ile | Val | Thr | Leu | Ile | Cys | Leu | Leu | Cys |
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| Lys | Lys | Lys | Arg | Arg | Arg | Asp | Glu | Glu | Asp | Ala | Tyr | Tyr | Val | Pro | Pro |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Pro | Pro | Pro | Pro | Gly | Pro | Lys | Ala | Gly | Gly | Pro | Tyr | Gly | Gly | Gln | Gln |
| | | | | 180 | | | | 185 | | | | | 190 | | |
| Gln | Gln | Trp | Arg | Gln | Gln | Asn | Ala | Thr | Pro | Pro | Ser | Asp | His | Val | Val |
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| Thr | Ser | Leu | Pro | Pro | Pro | Pro | Lys | Ala | Pro | Ser | Pro | Pro | Arg | Gln | Pro |
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| Pro | Pro | Pro | Pro | Pro | Pro | Pro | Phe | Met | Ser | Ser | Ser | Gly | Gly | Ser | Asp |
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| Tyr | Ser | Asp | Arg | Pro | Val | Leu | Pro | Pro | Pro | Ser | Pro | Gly | Leu | Val | Leu |
| | | | | 245 | | | | 250 | | | | | | 255 | |
| Gly | Phe | Ser | Lys | Ser | Thr | Phe | Thr | Tyr | Glu | Glu | Leu | Ala | Arg | Ala | Thr |
| | | | 260 | | | | 265 | | | | | | 270 | | |
| Asn | Gly | Phe | Ser | Glu | Ala | Asn | Leu | Leu | Gly | Gln | Gly | Gly | Phe | Gly | Tyr |
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| | | | | | | 295 | | | | | 300 | | | | |
| Leu | Lys | Val | Gly | Ser | Gly | Gln | Gly | Glu | Arg | Glu | Phe | Gln | Ala | Glu | Val |
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| Glu | Ile | Ile | Ser | Arg | Val | His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly |
| | | | | 325 | | | | 330 | | | | | | 335 | |
| Tyr | Cys | Ile | Ala | Gly | Ala | Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | Val | Pro |
| | | | 340 | | | | 345 | | | | | | 350 | | |
| Asn | Asn | Asn | Leu | Glu | Leu | His | Leu | His | Gly | Glu | Gly | Arg | Pro | Thr | Met |
| | | 355 | | | | 360 | | | | | | 365 | | | |
| Glu | Trp | Ser | Thr | Arg | Leu | Lys | Ile | Ala | Leu | Gly | Ser | Ala | Lys | Gly | Leu |
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| Ser | Tyr | Leu | His | Glu | Asp | Cys | Asn | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile |
| 385 | | | | 390 | | | | | | 395 | | | | 400 | |
| Lys | Ala | Ser | Asn | Ile | Leu | Ile | Asp | Phe | Lys | Phe | Glu | Ala | Lys | Val | Ala |
| | | | 405 | | | | | 410 | | | | | | 415 | |
| Asp | Phe | Gly | Leu | Ala | Lys | Ile | Ala | Ser | Asp | Thr | Asn | Thr | His | Val | Ser |
| | | | 420 | | | | 425 | | | | | | 430 | | |
| Thr | Arg | Val | Met | Gly | Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ala |
| | | | 435 | | | | 440 | | | | | 445 | | | |
| Ser | Gly | Lys | Leu | Thr | Glu | Lys | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val |
| | 450 | | | | | 455 | | | | | 460 | | | | |
| Leu | Leu | Glu | Leu | Ile | Thr | Gly | Arg | Arg | Pro | Val | Asp | Ala | Asn | Asn | Val |
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| Tyr | Val | Asp | Asp | Ser | Leu | Val | Asp | Trp | Ala | Arg | Pro | Leu | Leu | Asn | Arg |
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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ala | Ser | Glu | Gln | Gly | Asp | Phe | Glu | Gly | Leu | Ala | Asp | Ala | Lys | Met | Asn | |
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| Asn | Gly | Tyr | Asp | Arg | Glu | Glu | Met | Ala | Arg | Met | Val | Ala | Cys | Ala | Ala | |
| | | 515 | | | | | 520 | | | | | 525 | | | | |
| Ala | Cys | Val | Arg | His | Ser | Ala | Arg | Arg | Arg | Pro | Arg | Met | Ser | Gln | Ile | |
| | | 530 | | | | 535 | | | | | 540 | | | | | |
| Val | Arg | Ala | Leu | Glu | Gly | Asn | Val | Ser | Leu | Ser | Asp | Leu | Asn | Glu | Gly | |
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| Asp | Tyr | Asp | Ser | Ser | Gln | Tyr | Asn | Glu | Asp | Met | Lys | Lys | Phe | Arg | Lys | |
| | | | 580 | | | | | 585 | | | | | 590 | | | |
| Met | Ala | Leu | Gly | Thr | Gln | Glu | Tyr | Asn | Ala | Thr | Gly | Glu | Tyr | Ser | Asn | |
| | | 595 | | | | | 600 | | | | | 605 | | | | |
| Pro | Thr | Ser | Asp | Tyr | Gly | Leu | Tyr | Pro | Ser | Gly | Ser | Ser | Ser | Glu | Gly | |
| | | 610 | | | | 615 | | | | | | 620 | | | | |
| Gln | Thr | Thr | Arg | Glu | Met | Glu | Met | Gly | Lys | Ile | Lys | Arg | Thr | Gly | Gln | |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 | |
| Gly | Tyr | Ser | Gly | Pro | Ser | Leu | | | | | | | | | | |
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| | | Met Ser Ser Ala Pro Ser 1 5 |
| ccg ggg act | ggt tcg cct | cca tct cca cca tca aac tcc aca acc acc 162 |
| Pro Gly Thr | Gly Ser Pro | Pro Pro Ser Pro Pro Ser Asn Ser Thr Thr Thr 10 15 20 |
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| Thr Pro Pro | Pro Ala Ser | Ala Pro Pro Pro Thr Thr Pro Ser Ser Pro 25 30 35 |
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| Pro Pro Pro | Ser Thr Ile | Pro Thr Ser Pro Pro Pro Ser Ser Arg Ser 40 45 50 |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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| Thr | Pro | Ser | Ala | Pro | Pro | Pro | Ser | Pro | Pro | Thr | Pro | Ser | Thr | Pro | Gly | |
| 55 | | | | | 60 | | | | | 65 | | | | | 70 | |
| tct | cca | cct | cct | ctt | cct | cag | ccg | tct | cca | ccc | gct | cca | act | acg | ccc | 354 |
| Ser | Pro | Pro | Pro | Leu | Pro | Gln | Pro | Ser | Pro | Pro | Ala | Pro | Thr | Thr | Pro | |
| | | | | 75 | | | | | 80 | | | | | 85 | | |
| gga | tct | cca | ccc | gca | cct | gtt | act | cct | cct | act | cga | aac | cct | cca | cct | 402 |
| Gly | Ser | Pro | Pro | Ala | Pro | Val | Thr | Pro | Pro | Thr | Arg | Asn | Pro | Pro | Pro | |
| | | | 90 | | | | | 95 | | | | | 100 | | | |
| tca | gtc | cca | gga | cca | ccg | tcc | aat | cct | tca | cgc | gaa | gga | gga | tct | cct | 450 |
| Ser | Val | Pro | Gly | Pro | Pro | Ser | Asn | Pro | Ser | Arg | Glu | Gly | Gly | Ser | Pro | |
| | | 105 | | | | | 110 | | | | | 115 | | | | |
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| | 120 | | | | | 125 | | | | | 130 | | | | | |
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| Ser | Thr | Gly | Val | Val | Val | Gly | Ile | Ala | Ile | Gly | Gly | Val | Ala | Leu | Leu | |
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| Val | Ile | Val | Thr | Leu | Ile | Cys | Leu | Leu | Cys | Lys | Lys | Lys | Arg | Arg | Arg | |
| | | | | 155 | | | | | 160 | | | | | 165 | | |
| gac | gaa | gaa | gat | gct | tac | tat | gtt | cct | ccg | cca | cct | cct | cct | ggc | ccc | 642 |
| Asp | Glu | Glu | Asp | Ala | Tyr | Tyr | Val | Pro | Pro | Pro | Pro | Pro | Pro | Gly | Pro | |
| | | | 170 | | | | | 175 | | | | | 180 | | | |
| aaa | gcc | gga | gga | cct | tac | ggc | gga | cag | cag | caa | caa | tgg | cgg | caa | caa | 690 |
| Lys | Ala | Gly | Gly | Pro | Tyr | Gly | Gly | Gln | Gln | Gln | Gln | Trp | Arg | Gln | Gln | |
| | | 185 | | | | | 190 | | | | | 195 | | | | |
| aac | gca | aca | cca | ccg | tca | gat | cat | gtc | gtg | acg | tca | cta | cca | cca | cca | 738 |
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| cct | aag | gct | cca | tct | cca | cca | cgg | caa | cct | cct | cca | cct | cca | cca | ccg | 786 |
| Pro | Lys | Ala | Pro | Ser | Pro | Pro | Arg | Gln | Pro | Pro | Pro | Pro | Pro | Pro | Pro | |
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| cct | ttc | atg | agc | agc | agc | ggc | ggc | tcc | gac | tac | tcg | gac | cgt | cca | gtt | 834 |
| Pro | Phe | Met | Ser | Ser | Ser | Gly | Gly | Ser | Asp | Tyr | Ser | Asp | Arg | Pro | Val | |
| | | | | 235 | | | | | 240 | | | | | 245 | | |
| ctt | cct | cca | ccg | tct | cca | ggg | ctt | gtg | tta | ggc | ttc | tcc | aaa | agc | act | 882 |
| Leu | Pro | Pro | Pro | Ser | Pro | Gly | Leu | Val | Leu | Gly | Phe | Ser | Lys | Ser | Thr | |
| | | | 250 | | | | | 255 | | | | | 260 | | | |
| ttc | aca | tac | gag | gag | cta | gct | aga | gcc | acc | aat | ggc | ttc | tcc | gag | gcg | 930 |
| Phe | Thr | Tyr | Glu | Glu | Leu | Ala | Arg | Ala | Thr | Asn | Gly | Phe | Ser | Glu | Ala | |

| 265 | | | | | 270 | | | | | 275 | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| aac | ttg | tta | gga | caa | ggc | ggg | ttc | ggt | tac | gtg | cac | aaa | ggt | gtg | ttg | 978 |
| Asn | Leu | Leu | Gly | Gln | Gly | Gly | Phe | Gly | Tyr | Val | His | Lys | Gly | Val | Leu | |
| 280 | | | | | | 285 | | | | | 290 | | | | | |
| cct | agt | ggg | aaa | gaa | gtt | gct | gtg | aag | cag | ttg | aaa | gtt | ggg | agt | ggt | 1026 |
| Pro | Ser | Gly | Lys | Glu | Val | Ala | Val | Lys | Gln | Leu | Lys | Val | Gly | Ser | Gly | |
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| cag | gga | gag | agg | gag | ttt | cag | gca | gag | gtt | gag | atc | atc | agc | aga | gtt | 1074 |
| Gln | Gly | Glu | Arg | Glu | Phe | Gln | Ala | Glu | Val | Glu | Ile | Ile | Ser | Arg | Val | |
| | | | | 315 | | | | | 320 | | | | | 325 | | |
| cac | cac | agg | cat | ctg | gtg | tct | ctt | gtt | ggt | tat | tgc | atc | gcc | ggt | gcc | 1122 |
| His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly | Tyr | Cys | Ile | Ala | Gly | Ala | |
| | | | 330 | | | | | 335 | | | | | 340 | | | |
| aaa | aga | ttg | ctt | gtc | tat | gag | ttt | gtt | cct | aac | aac | aat | ctc | gag | ctt | 1170 |
| Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | Val | Pro | Asn | Asn | Asn | Leu | Glu | Leu | |
| | | 345 | | | | | 350 | | | | | 355 | | | | |
| cac | ctc | cat | ggc | gag | gga | cgg | cct | aca | atg | gaa | tgg | agc | acc | aga | ttg | 1218 |
| His | Leu | His | Gly | Glu | Gly | Arg | Pro | Thr | Met | Glu | Trp | Ser | Thr | Arg | Leu | |
| | 360 | | | | | 365 | | | | | 370 | | | | | |
| aag | att | gct | ctt | gga | tct | gct | aaa | gga | ctt | tct | tat | ctt | cat | gaa | gat | 1266 |
| Lys | Ile | Ala | Leu | Gly | Ser | Ala | Lys | Gly | Leu | Ser | Tyr | Leu | His | Glu | Asp | |
| 375 | | | | | 380 | | | | | 385 | | | | | 390 | |
| tgc | aat | cct | aaa | atc | att | cac | cgt | gat | atc | aag | gct | tca | aac | ata | ttg | 1314 |
| Cys | Asn | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile | Lys | Ala | Ser | Asn | Ile | Leu | |
| | | | | 395 | | | | | 400 | | | | | 405 | | |
| ata | gat | ttc | aag | ttt | gaa | gct | aag | gtt | gct | gat | ttt | ggt | ctt | gct | aag | 1362 |
| Ile | Asp | Phe | Lys | Phe | Glu | Ala | Lys | Val | Ala | Asp | Phe | Gly | Leu | Ala | Lys | |
| | | | 410 | | | | | 415 | | | | | 420 | | | |
| att | gct | tct | gat | aca | aac | acg | cat | gta | tca | aca | cgt | gtg | atg | gga | acc | 1410 |
| Ile | Ala | Ser | Asp | Thr | Asn | Thr | His | Val | Ser | Thr | Arg | Val | Met | Gly | Thr | |
| | | | 425 | | | | 430 | | | | | 435 | | | | |
| ttt | ggg | tac | ttg | gct | ccg | gaa | tac | gct | gca | agc | gga | aag | ctc | acg | gag | 1458 |
| Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ala | Ser | Gly | Lys | Leu | Thr | Glu | |
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| aag | tct | gac | gtt | ttc | tca | ttt | ggc | gtt | gtg | ctt | ttg | gag | ctc | att | act | 1506 |
| Lys | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val | Leu | Leu | Glu | Leu | Ile | Thr | |
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| gga | cgt | cga | ccc | gtt | gat | gcc | aac | aat | gtc | tat | gta | gat | gac | agc | tta | 1554 |
| Gly | Arg | Arg | Pro | Val | Asp | Ala | Asn | Asn | Val | Tyr | Val | Asp | Asp | Ser | Leu | |
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| | |
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| gtt gac tgg gca cga cca ttg ctt aac cga gca tct gag caa gga gac | 1602 |
| Val Asp Trp Ala Arg Pro Leu Leu Asn Arg Ala Ser Glu Gln Gly Asp | |
| 490 495 500 | |
| ttt gag ggt tta gct gat gca aag atg aat aat ggg tat gac aga gag | 1650 |
| Phe Glu Gly Leu Ala Asp Ala Lys Met Asn Asn Gly Tyr Asp Arg Glu | |
| 505 510 515 | |
| gag atg gct cgc atg gtt gct tgt gct gcg gct tgt gtt cgc cat tca | 1698 |
| Glu Met Ala Arg Met Val Ala Cys Ala Ala Ala Cys Val Arg His Ser | |
| 520 525 530 | |
| gct cgc cgc aga cct cgc atg agc cag att gtg cgt gcg tta gaa gga | 1746 |
| Ala Arg Arg Arg Pro Arg Met Ser Gln Ile Val Arg Ala Leu Glu Gly | |
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| Asn Val Ser Leu Ser Asp Leu Asn Glu Gly Met Arg Pro Gly Gln Ser | |
| 555 560 565 | |
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| Asn Val Tyr Ser Ser Tyr Gly Gly Ser Thr Asp Tyr Asp Ser Ser Gln | |
| 570 575 580 | |
| tac aat gaa gac atg aag aag ttt agg aaa atg gca ctt gga act caa | 1890 |
| Tyr Asn Glu Asp Met Lys Lys Phe Arg Lys Met Ala Leu Gly Thr Gln | |
| 585 590 595 | |
| gag tac aac gcc acg ggt gag tac agt aat ccg acc agt gac tat gga | 1938 |
| Glu Tyr Asn Ala Thr Gly Glu Tyr Ser Asn Pro Thr Ser Asp Tyr Gly | |
| 600 605 610 | |
| ctg tac ccg tct ggt tca agc agc gag ggc caa acc aca cgc gaa atg | 1986 |
| Leu Tyr Pro Ser Gly Ser Ser Ser Glu Gly Gln Thr Thr Arg Glu Met | |
| 615 620 625 630 | |
| gag atg ggg aag att aag aga acc ggt cag ggt tat agt gga cct tct | 2034 |
| Glu Met Gly Lys Ile Lys Arg Thr Gly Gln Gly Tyr Ser Gly Pro Ser | |
| 635 640 645 | |
| ctt t aaaccagatg ggagagaaat tgaagggtgt tttttcatta tttttttaaa | 2088 |
| Leu | |
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<400> 4

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| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Thr | Thr | Pro | Ser | Ser | Pro | Pro | Pro | Pro | Ser | Thr | Ile | Pro | Thr | Ser | Pro | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| Pro | Pro | Ser | Ser | Arg | Ser | Thr | Pro | Ser | Ala | Pro | Pro | Pro | Ser | Pro | Pro | |
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| Thr | Pro | Ser | Thr | Pro | Gly | Ser | Pro | Pro | Pro | Leu | Pro | Gln | Pro | Ser | Pro | |
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| Pro | Ala | Pro | Thr | Thr | Pro | Gly | Ser | Pro | Pro | Ala | Pro | Val | Thr | Pro | Pro | |
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| Thr | Arg | Asn | Pro | Pro | Pro | Ser | Val | Pro | Gly | Pro | Pro | Ser | Asn | Pro | Ser | |
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| Pro | Ser | Ser | Asp | Gly | Leu | Ser | Thr | Gly | Val | Val | Val | Gly | Ile | Ala | Ile | |
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| Gly | Gly | Val | Ala | Leu | Leu | Val | Ile | Val | Thr | Leu | Ile | Cys | Leu | Leu | Cys | |
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| Pro | Pro | Pro | Pro | Gly | Pro | Lys | Ala | Gly | Gly | Pro | Tyr | Gly | Gly | Gln | Gln | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Gln | Gln | Trp | Arg | Gln | Gln | Asn | Ala | Thr | Pro | Pro | Ser | Asp | His | Val | Val | |
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| Thr | Ser | Leu | Pro | Pro | Pro | Pro | Lys | Ala | Pro | Ser | Pro | Pro | Arg | Gln | Pro | |
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| Pro | Pro | Pro | Pro | Pro | Pro | Pro | Phe | Met | Ser | Ser | Ser | Gly | Gly | Ser | Asp | |
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| Tyr | Ser | Asp | Arg | Pro | Val | Leu | Pro | Pro | Pro | Ser | Pro | Gly | Leu | Val | Leu | |
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| Gly | Phe | Ser | Lys | Ser | Thr | Phe | Thr | Tyr | Glu | Glu | Leu | Ala | Arg | Ala | Thr | |
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| Asn | Gly | Phe | Ser | Glu | Ala | Asn | Leu | Leu | Gly | Gln | Gly | Gly | Phe | Gly | Tyr | |
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| Val | His | Lys | Gly | Val | Leu | Pro | Ser | Gly | Lys | Glu | Val | Ala | Val | Lys | Gln | |
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| Leu | Lys | Val | Gly | Ser | Gly | Gln | Gly | Glu | Arg | Glu | Phe | Gln | Ala | Glu | Val | |
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| Glu | Ile | Ile | Ser | Arg | Val | His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly | |
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| Tyr | Cys | Ile | Ala | Gly | Ala | Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | Val | Pro | |
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| Asn | Asn | Asn | Leu | Glu | Leu | His | Leu | His | Gly | Glu | Gly | Arg | Pro | Thr | Met | |
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| Glu | Trp | Ser | Thr | Arg | Leu | Lys | Ile | Ala | Leu | Gly | Ser | Ala | Lys | Gly | Leu | |
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| Ser | Tyr | Leu | His | Glu | Asp | Cys | Asn | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile | |
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| Lys | Ala | Ser | Asn | Ile | Leu | Ile | Asp | Phe | Lys | Phe | Glu | Ala | Lys | Val | Ala | |
| | | | 405 | | | | | | 410 | | | | | 415 | | |
| Asp | Phe | Gly | Leu | Ala | Lys | Ile | Ala | Ser | Asp | Thr | Asn | Thr | His | Val | Ser | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Thr | Arg | Val | Met | Gly | Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ala |
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| Ser | Gly | Lys | Leu | Thr | Glu | Lys | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val |
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| Leu | Leu | Glu | Leu | Ile | Thr | Gly | Arg | Arg | Pro | Val | Asp | Ala | Asn | Asn | Val |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 |
| Tyr | Val | Asp | Asp | Ser | Leu | Val | Asp | Trp | Ala | Arg | Pro | Leu | Leu | Asn | Arg |
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| Ala | Ser | Glu | Gln | Gly | Asp | Phe | Glu | Gly | Leu | Ala | Asp | Ala | Lys | Met | Asn |
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| Asn | Gly | Tyr | Asp | Arg | Glu | Glu | Met | Ala | Arg | Met | Val | Ala | Cys | Ala | Ala |
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| Ala | Cys | Val | Arg | His | Ser | Ala | Arg | Arg | Arg | Pro | Arg | Met | Ser | Gln | Ile |
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| Val | Arg | Ala | Leu | Glu | Gly | Asn | Val | Ser | Leu | Ser | Asp | Leu | Asn | Glu | Gly |
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| Met | Arg | Pro | Gly | Gln | Ser | Asn | Val | Tyr | Ser | Ser | Tyr | Gly | Gly | Ser | Thr |
| | | | | 565 | | | | 570 | | | | | | 575 | |
| Asp | Tyr | Asp | Ser | Ser | Gln | Tyr | Asn | Glu | Asp | Met | Lys | Lys | Phe | Arg | Lys |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Met | Ala | Leu | Gly | Thr | Gln | Glu | Tyr | Asn | Ala | Thr | Gly | Glu | Tyr | Ser | Asn |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Pro | Thr | Ser | Asp | Tyr | Gly | Leu | Tyr | Pro | Ser | Gly | Ser | Ser | Ser | Glu | Gly |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| Gln | Thr | Thr | Arg | Glu | Met | Glu | Met | Gly | Lys | Ile | Lys | Arg | Thr | Gly | Gln |
| 625 | | | | 630 | | | | | | 635 | | | | | 640 |
| Gly | Tyr | Ser | Gly | Pro | Ser | Leu | | | | | | | | | |
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<400> 5

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| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| His | Ser | Leu | His | Leu | Pro | Phe | Phe | Arg | Ser | Lys | Glu | Ala | Asp | Met | Ser |
| | | | 20 | | | | | 25 | | | | | 30 | | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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| | | | | | | | | | | | | | | | |
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| Ser | Thr | Thr | Thr | Thr | Pro | Pro | Pro | Ala | Ser | Ala | Pro | Pro | Pro | Thr | Thr |
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Pro Ser Ser Pro Pro Pro Pro Ser Thr Ile Pro Thr Ser Pro Pro Pro
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Ser Ser Arg Ser Thr Pro Ser Ala Pro Pro Pro Ser Pro Pro Thr Pro
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Ser Thr Pro Gly Ser Pro Pro Pro Leu Pro Gln Pro Ser Pro Pro Ala
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Pro Thr Thr Pro Gly Ser Pro Pro Ala Pro Val Thr Pro Pro Thr Arg
115 120 125

Asn Pro Pro Pro Ser Val Pro Gly Pro Pro Ser Asn Pro Ser Arg Glu
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Gly Gly Ser Pro Arg Pro Pro Ser Ser Pro Ser Pro Pro Ser Pro Ser
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Ser Asp Gly Leu Ser Thr Gly Val Val Val Gly Ile Ala Ile Gly Gly
165 170 175

Val Ala Leu Leu Val Ile Val Thr Leu Ile Cys Leu Leu Cys Lys Lys
180 185 190

Lys Arg Arg Arg Asp Glu Glu Asp Ala Tyr Tyr Val Pro Pro Pro Pro
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Pro Pro Gly Pro Lys Ala Gly Gly Pro Tyr Gly Gly Gln Gln Gln Gln
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Trp Arg Gln Gln Asn Ala Thr Pro Pro Ser Asp His Val Val Thr Ser
225 230 235 240

Leu Pro Pro Pro Pro Lys Ala Pro Ser Pro Pro Arg Gln Pro Pro Pro
245 250 255

Pro Pro Pro Pro Pro Phe Met Ser Ser Ser Gly Gly Ser Asp Tyr Ser
260 265 270

Asp Arg Pro Val Leu Pro Pro Pro Ser Pro Gly Leu Val Leu Gly Phe

275

280

285

Ser Lys Ser Thr Phe Thr Tyr Glu Glu Leu Ala Arg Ala Thr Asn Gly
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Phe Ser Glu Ala Asn Leu Leu Gly Gln Gly Gly Phe Gly Tyr Val His
 305 310 315 320

Lys Gly Val Leu Pro Ser Gly Lys Glu Val Ala Val Lys Gln Leu Lys
 325 330 335

Val Gly Ser Gly Gln Gly Glu Arg Glu Phe Gln Ala Glu Val Glu Ile
 340 345 350

Ile Ser Arg Val His His Arg His Leu Val Ser Leu Val Gly Tyr Cys
 355 360 365

Ile Ala Gly Ala Lys Arg Leu Leu Val Tyr Glu Phe Val Pro Asn Asn
 370 375 380

Asn Leu Glu Leu His Leu His Gly Glu Gly Arg Pro Thr Met Glu Trp
 385 390 395 400

Ser Thr Arg Leu Lys Ile Ala Leu Gly Ser Ala Lys Gly Leu Ser Tyr
 405 410 415

Leu His Glu Asp Cys Asn Pro Lys Ile Ile His Arg Asp Ile Lys Ala
 420 425 430

Ser Asn Ile Leu Ile Asp Phe Lys Phe Glu Ala Lys Val Ala Asp Phe
 435 440 445

Gly Leu Ala Lys Ile Ala Ser Asp Thr Asn Thr His Val Ser Thr Arg
 450 455 460

Val Met Gly Thr Phe Gly Tyr Leu Ala Pro Glu Tyr Ala Ala Ser Gly
 465 470 475 480

Lys Leu Thr Glu Lys Ser Asp Val Phe Ser Phe Gly Val Val Leu Leu
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Glu Leu Ile Thr Gly Arg Arg Pro Val Asp Ala Asn Asn Val Tyr Val
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Asp Asp Ser Leu Val Asp Trp Ala Arg Pro Leu Leu Asn Arg Ala Ser
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Glu Gln Gly Asp Phe Glu Gly Leu Ala Asp Ala Lys Met Asn Asn Gly
530 535 540

Tyr Asp Arg Glu Glu Met Ala Arg Met Val Ala Cys Ala Ala Ala Cys
545 550 555 560

Val Arg His Ser Ala Arg Arg Arg Pro Arg Met Ser Gln Ile Val Arg
565 570 575

Ala Leu Glu Gly Asn Val Ser Leu Ser Asp Leu Asn Glu Gly Met Arg
580 585 590

Pro Gly Gln Ser Asn Val Tyr Ser Ser Tyr Gly Gly Ser Thr Asp Tyr
595 600 605

Asp Ser Ser Gln Tyr Asn Glu Asp Met Lys Lys Phe Arg Lys Met Ala
610 615 620

Leu Gly Thr Gln Glu Tyr Asn Ala Thr Gly Glu Tyr Ser Asn Pro Thr
625 630 635 640

Ser Asp Tyr Gly Leu Tyr Pro Ser Gly Ser Ser Ser Glu Gly Gln Thr
645 650 655

Thr Arg Glu Met Glu Met Gly Lys Ile Lys Arg Thr Gly Gln Gly Tyr
660 665 670

Ser Gly Pro Ser Leu Thr Arg Trp Glu Arg Asn Arg Val Phe Phe His
675 680 685

Tyr Phe Phe Lys Thr Val Lys Ile Glu Asn Cys Leu Thr Leu Ile Lys
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710

715

720

Lys

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| ttcctctcct | cctagtccac | cagctgattc | atcatcaaca | ccgccgctgt | cagaaccatc | 180 |
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| aatcatggcg | cttataggcg | ttgtgttctt | agtgagaaga | aagaaaaaga | gaaacattga | 840 |
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| agatgatgaa | tatgaagctc | aggcaataat | gaaatcctcc | ttttcggttaa | atctatctta | 1560 |
| tgactgtaaa | gttttagttg | ctgatttttg | acttgctaga | ctcaatgata | caacacaaac | 1620 |
| tcactgtttca | actcgggtta | tgggaacctt | cgggtaccta | gcgccggaat | atgcatcaag | 1680 |
| tgggaaaattg | actgatagat | ccgatgtatt | ctcattcggg | gttggttctct | tagagcttgt | 1740 |
| taactggacgg | aaaccagttg | accagactca | gcctctagga | gaagagagtt | tgggtgaatg | 1800 |
| ggcgcgcccc | ctgcttctca | aagccattga | gaccggagat | ttaagcgaac | tgattgatac | 1860 |
| acggcttgaa | aagcgttatg | tggagcatga | agtcttcaga | atgatcgaga | cagccgctgc | 1920 |
| atgtgttaga | cattctgggtc | caaaacgccc | acgcatgggt | caggttgtga | gagcattgga | 1980 |
| ctgcgacgga | gactcgggag | atattagcaa | cggaatcaaa | attgggcaaa | gcacaactta | 2040 |
| tgactcaggg | caatacaatg | aagacattat | gaaattcagg | aaaatggcgt | ttgggtgggta | 2100 |
| taacagcgta | gagtcaggat | tgtacagtgg | aaactactct | gccaaaagct | cttcagattt | 2160 |
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| gct gat acc gct cct cca cca gag act cca tca gaa aac tca gct ctt | 96 |
| Ala Asp Thr Ala Pro Pro Pro Glu Thr Pro Ser Glu Asn Ser Ala Leu | |
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| Pro Pro Val Asp Ser Ser Pro Pro Ser Pro Pro Ala Asp Ser Ser Ser | |
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| Thr Pro Pro Leu Ser Glu Pro Ser Thr Pro Pro Pro Asp Ser Gln Leu | |
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| cct cct tta cct tcg att ctt cct ccg cta aca gat tct cca cct cca | 240 |
| Pro Pro Leu Pro Ser Ile Leu Pro Pro Leu Thr Asp Ser Pro Pro Pro | |
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| cct tcc gat tct tct cca ccc gtt gat tca acc cct tct ccg ccg cca | 288 |
| Pro Ser Asp Ser Ser Pro Pro Val Asp Ser Thr Pro Ser Pro Pro Pro | |
| 85 90 95 | |
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| Pro Thr Ser Asn Glu Ser Pro Ser Pro Pro Glu Asp Ser Glu Thr Pro | |
| 100 105 110 | |
| cct gct cca cca aat gaa tcc aat gac aac aac cct cct ccg tct caa | 384 |
| Pro Ala Pro Pro Asn Glu Ser Asn Asp Asn Asn Pro Pro Pro Ser Gln | |
| 115 120 125 | |
| gat ctt caa tcg cct cct cca tcg tcg ccg tcg ccg aat gta gga ccc | 432 |
| Asp Leu Gln Ser Pro Pro Pro Ser Ser Pro Ser Pro Asn Val Gly Pro | |
| 130 135 140 | |
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| Thr Asn Pro Glu Ser Pro Pro Leu Gln Ser Pro Pro Ala Pro Pro Ala | |
| 145 150 155 160 | |
| tca gat cct aca aat tca ccg cca gct tca cca tta gac cct acc aat | 528 |
| Ser Asp Pro Thr Asn Ser Pro Pro Ala Ser Pro Leu Asp Pro Thr Asn | |
| 165 170 175 | |
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| Pro Pro Pro Ile Gln Pro Ser Gly Pro Ala Thr Ser Pro Pro Ala Asn | |

| 180 | | | | | | 185 | | | | | | 190 | | | | | | |
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| tct Ser | agt Ser 210 | gga Gly | cct Pro | gtg Val | gtg Val | tct Ser 215 | cca Pro | tct Ser | ctc Leu | aca Thr | tcc Ser 220 | cct Pro | agt Ser | aaa Lys | gga Gly | 672 | | |
| act Thr 225 | cct Pro | act Thr | cca Pro | aac Asn | caa Gln 230 | ggc Gly | aat Asn | gga Gly | gat Asp | ggc Gly 235 | ggg Gly | ggc Gly | ggg Gly | ggg Gly | ggc Gly 240 | 720 | | |
| ggc Gly | tat Tyr | caa Gln | ggg Gly | aag Lys 245 | act Thr | atg Met | gtt Val | ggg Gly | atg Met 250 | gct Ala | gta Val | gcc Ala | ggg Gly | ttc Phe 255 | gca Ala | 768 | | |
| atc Ile | atg Met | gcg Ala | ctt Leu 260 | ata Ile | ggc Gly | gtt Val | gtg Val | ttc Phe 265 | tta Leu | gtg Val | aga Arg | aga Arg | aag Lys 270 | aaa Lys | aag Lys | 816 | | |
| aga Arg | aac Asn | att Ile 275 | gat Asp | agc Ser | tat Tyr | aat Asn | cac His 280 | tca Ser | cag Gln | tac Tyr | ttg Leu | cca Pro 285 | cat His | ccc Pro | aat Asn | 864 | | |
| ttc Phe | tct Ser 290 | gtt Val | aaa Lys | tca Ser | gat Asp | gga Gly 295 | ttc Phe | tta Leu | tac Tyr | ggg Gly | caa Gln 300 | gat Asp | cca Pro | ggg Gly | aaa Lys | 912 | | |
| gga Gly 305 | tac Tyr | tcc Ser | tct Ser | ggg Gly | cct Pro 310 | aat Asn | ggg Gly | tca Ser | atg Met | tat Tyr 315 | aac Asn | aat Asn | tca Ser | cag Gln | caa Gln 320 | 960 | | |
| caa Gln | caa Gln | tcc Ser | tct Ser | atg Met 325 | gga Gly | aac Asn | agt Ser | tat Tyr | ggg Gly 330 | aca Thr | gct Ala | ggg Gly | ggg Gly | ggg Gly 335 | tat Tyr | 1008 | | |
| cct Pro | cat His | cat His | caa Gln 340 | atg Met | caa Gln | tca Ser | agt Ser | ggc Gly 345 | aca Thr | cct Pro | gac Asp | tct Ser | gct Ala 350 | ata Ile | ctc Leu | 1056 | | |
| gga Gly | agt Ser | ggc Gly 355 | cag Gln | act Thr | cat His | ttc Phe 360 | agt Ser | tac Tyr | gaa Glu | gag Glu | ctt Leu | gct Ala 365 | gag Glu | ata Ile | aca Thr | 1104 | | |
| caa Gln | ggc Gly 370 | ttt Phe | gct Ala | cgc Arg | aaa Lys | aac Asn 375 | att Ile | ctt Leu | gga Gly | gaa Glu | ggc Gly 380 | gga Gly | ttt Phe | gga Gly | tgt Cys | 1152 | | |
| gtc Val 385 | tat Tyr | aaa Lys | ggg Gly | aca Thr | ttg Leu 390 | cag Gln | gat Asp | ggg Gly | aaa Lys | gtt Val 395 | gtt Val | gcg Ala | gtt Val | aag Lys | cag Gln 400 | 1200 | | |

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| ctt | aaa | gct | gga | agt | gga | caa | ggt | gac | cgt | gaa | ttc | aaa | gca | gag | gtt | 1248 |
| Leu | Lys | Ala | Gly | Ser | Gly | Gln | Gly | Asp | Arg | Glu | Phe | Lys | Ala | Glu | Val | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| gag | atc | atc | agc | cgc | gtt | cat | cat | cgc | cat | ttg | gtc | tct | ctg | gtt | ggt | 1296 |
| Glu | Ile | Ile | Ser | Arg | Val | His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly | |
| | | | 420 | | | | | 425 | | | | | 430 | | | |
| tac | tgc | att | tca | gac | cag | cat | aga | ttg | ctt | atc | tat | gag | tat | gtt | tct | 1344 |
| Tyr | Cys | Ile | Ser | Asp | Gln | His | Arg | Leu | Leu | Ile | Tyr | Glu | Tyr | Val | Ser | |
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| aat | caa | acc | ttg | gag | cat | cat | ttg | cat | gag | tgg | tct | aag | aga | gtc | cgg | 1392 |
| Asn | Gln | Thr | Leu | Glu | His | His | Leu | His | Glu | Trp | Ser | Lys | Arg | Val | Arg | |
| | 450 | | | | | 455 | | | | | 460 | | | | | |
| atc | gct | ata | gga | tca | gcc | aaa | ggg | ttg | gca | tat | ctt | cac | gaa | gac | tgt | 1440 |
| Ile | Ala | Ile | Gly | Ser | Ala | Lys | Gly | Leu | Ala | Tyr | Leu | His | Glu | Asp | Cys | |
| 465 | | | | | 470 | | | | 475 | | | | | | 480 | |
| cat | ccg | aaa | atc | att | cac | aga | gat | ata | aag | tca | gca | aat | att | ctt | cta | 1488 |
| His | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile | Lys | Ser | Ala | Asn | Ile | Leu | Leu | |
| | | | 485 | | | | | 490 | | | | | | 495 | | |
| gat | gat | gaa | tat | gaa | gct | cag | gca | ata | atg | aaa | tcc | tcc | ttt | tcg | tta | 1536 |
| Asp | Asp | Glu | Tyr | Glu | Ala | Gln | Ala | Ile | Met | Lys | Ser | Ser | Phe | Ser | Leu | |
| | | 500 | | | | | 505 | | | | | | 510 | | | |
| aat | cta | tct | tat | gac | tgt | aaa | gtt | tta | gtt | gct | gat | ttt | gga | ctt | gct | 1584 |
| Asn | Leu | Ser | Tyr | Asp | Cys | Lys | Val | Leu | Val | Ala | Asp | Phe | Gly | Leu | Ala | |
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| Arg | Leu | Asn | Asp | Thr | Thr | Gln | Thr | His | Val | Ser | Thr | Arg | Val | Met | Gly | |
| | 530 | | | | | 535 | | | | | 540 | | | | | |
| acc | ttc | ggg | tac | cta | gcg | ccg | gaa | tat | gca | tca | agt | gga | aaa | ttg | act | 1680 |
| Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ser | Ser | Gly | Lys | Leu | Thr | |
| 545 | | | | | 550 | | | | 555 | | | | | | 560 | |
| gat | aga | tcc | gat | gta | ttc | tca | ttc | ggg | gtt | gtt | ctc | tta | gag | ctt | gta | 1728 |
| Asp | Arg | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val | Leu | Leu | Glu | Leu | Val | |
| | | | 565 | | | | | 570 | | | | | | 575 | | |
| act | gga | cgg | aaa | cca | gtt | gac | cag | act | cag | cct | cta | gga | gaa | gag | agt | 1776 |
| Thr | Gly | Arg | Lys | Pro | Val | Asp | Gln | Thr | Gln | Pro | Leu | Gly | Glu | Glu | Ser | |
| | | | 580 | | | | 585 | | | | | | 590 | | | |
| ttg | gtt | gaa | tgg | gcg | cgc | ccg | ctg | ctt | ctc | aaa | gcc | att | gag | acc | gga | 1824 |
| Leu | Val | Glu | Trp | Ala | Arg | Pro | Leu | Leu | Leu | Lys | Ala | Ile | Glu | Thr | Gly | |
| | | 595 | | | | | 600 | | | | | 605 | | | | |
| gat | tta | agc | gaa | ctg | att | gat | aca | cgg | ctt | gaa | aag | cgt | tat | gtg | gag | 1872 |
| Asp | Leu | Ser | Glu | Leu | Ile | Asp | Thr | Arg | Leu | Glu | Lys | Arg | Tyr | Val | Glu | |

| 610 | | | | | 615 | | | | | 620 | | | | | | |
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| His | Glu | Val | Phe | Arg | Met | Ile | Glu | Thr | Ala | Ala | Ala | Cys | Val | Arg | His | |
| 625 | | | | | 630 | | | | 635 | | | | | | 640 | |
| tct | ggt | cca | aaa | cgc | cca | cgc | atg | gtt | cag | gtt | gtg | aga | gca | ttg | gac | 1968 |
| Ser | Gly | Pro | Lys | Arg | Pro | Arg | Met | Val | Gln | Val | Val | Arg | Ala | Leu | Asp | |
| | | | | 645 | | | | | 650 | | | | | 655 | | |
| tgc | gac | gga | gac | tcg | gga | gat | att | agc | aac | gga | atc | aaa | att | ggg | caa | 2016 |
| Cys | Asp | Gly | Asp | Ser | Gly | Asp | Ile | Ser | Asn | Gly | Ile | Lys | Ile | Gly | Gln | |
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| agc | aca | act | tat | gac | tca | ggg | caa | tac | aat | gaa | gac | att | atg | aaa | ttc | 2064 |
| Ser | Thr | Thr | Tyr | Asp | Ser | Gly | Gln | Tyr | Asn | Glu | Asp | Ile | Met | Lys | Phe | |
| | | | 675 | | | | 680 | | | | | 685 | | | | |
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| Arg | Lys | Met | Ala | Phe | Gly | Gly | Asp | Asn | Ser | Val | Glu | Ser | Gly | Leu | Tyr | |
| | 690 | | | | | 695 | | | | 700 | | | | | | |
| agt | gga | aac | tac | tct | gcc | aaa | agc | tct | tca | gat | ttc | tca | ggg | aat | gaa | 2160 |
| Ser | Gly | Asn | Tyr | Ser | Ala | Lys | Ser | Ser | Ser | Asp | Phe | Ser | Gly | Asn | Glu | |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 | |
| tct | gag | act | cgg | cct | ttc | aac | aac | cga | cgg | ttc | tga | | | | | 2196 |
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| 1 | | | | 5 | | | | 10 | | | | | 15 | | | |
| Ala | Asp | Thr | Ala | Pro | Pro | Pro | Glu | Thr | Pro | Ser | Glu | Asn | Ser | Ala | Leu | |
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| Pro | Pro | Val | Asp | Ser | Ser | Pro | Pro | Ser | Pro | Pro | Ala | Asp | Ser | Ser | Ser | |
| | | 35 | | | | 40 | | | | | 45 | | | | | |
| Thr | Pro | Pro | Leu | Ser | Glu | Pro | Ser | Thr | Pro | Pro | Pro | Asp | Ser | Gln | Leu | |
| | 50 | | | | 55 | | | | | | 60 | | | | | |
| Pro | Pro | Leu | Pro | Ser | Ile | Leu | Pro | Pro | Leu | Thr | Asp | Ser | Pro | Pro | Pro | |
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| Pro | Ser | Asp | Ser | Ser | Pro | Pro | Val | Asp | Ser | Thr | Pro | Ser | Pro | Pro | Pro | |
| | | | 85 | | | | | 90 | | | | | 95 | | | |
| Pro | Thr | Ser | Asn | Glu | Ser | Pro | Ser | Pro | Pro | Glu | Asp | Ser | Glu | Thr | Pro | |
| | | | 100 | | | | 105 | | | | | | 110 | | | |
| Pro | Ala | Pro | Pro | Asn | Glu | Ser | Asn | Asp | Asn | Asn | Pro | Pro | Pro | Ser | Gln | |
| | | | 115 | | | | 120 | | | | | | 125 | | | |

| | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Leu | Gln | Ser | Pro | Pro | Pro | Ser | Ser | Pro | Ser | Pro | Asn | Val | Gly | Pro | 130 | 135 | 140 |
| Thr | Asn | Pro | Glu | Ser | Pro | Pro | Leu | Gln | Ser | Pro | Pro | Ala | Pro | Pro | Ala | 145 | 150 | 155 |
| Ser | Asp | Pro | Thr | Asn | Ser | Pro | Pro | Ala | Ser | Pro | Leu | Asp | Pro | Thr | Asn | 165 | 170 | 175 |
| Pro | Pro | Pro | Ile | Gln | Pro | Ser | Gly | Pro | Ala | Thr | Ser | Pro | Pro | Ala | Asn | 180 | 185 | 190 |
| Pro | Asn | Ala | Pro | Pro | Ser | Pro | Phe | Pro | Thr | Val | Pro | Pro | Lys | Thr | Pro | 195 | 200 | 205 |
| Ser | Ser | Gly | Pro | Val | Val | Ser | Pro | Ser | Leu | Thr | Ser | Pro | Ser | Lys | Gly | 210 | 215 | 220 |
| Thr | Pro | Thr | Pro | Asn | Gln | Gly | Asn | Gly | Asp | Gly | Gly | Gly | Gly | Gly | Gly | 225 | 230 | 235 |
| Gly | Tyr | Gln | Gly | Lys | Thr | Met | Val | Gly | Met | Ala | Val | Ala | Gly | Phe | Ala | 245 | 250 | 255 |
| Ile | Met | Ala | Leu | Ile | Gly | Val | Val | Phe | Leu | Val | Arg | Arg | Lys | Lys | Lys | 260 | 265 | 270 |
| Arg | Asn | Ile | Asp | Ser | Tyr | Asn | His | Ser | Gln | Tyr | Leu | Pro | His | Pro | Asn | 275 | 280 | 285 |
| Phe | Ser | Val | Lys | Ser | Asp | Gly | Phe | Leu | Tyr | Gly | Gln | Asp | Pro | Gly | Lys | 290 | 295 | 300 |
| Gly | Tyr | Ser | Ser | Gly | Pro | Asn | Gly | Ser | Met | Tyr | Asn | Asn | Ser | Gln | Gln | 305 | 310 | 315 |
| Gln | Gln | Ser | Ser | Met | Gly | Asn | Ser | Tyr | Gly | Thr | Ala | Gly | Gly | Gly | Tyr | 325 | 330 | 335 |
| Pro | His | His | Gln | Met | Gln | Ser | Ser | Gly | Thr | Pro | Asp | Ser | Ala | Ile | Leu | 340 | 345 | 350 |
| Gly | Ser | Gly | Gln | Thr | His | Phe | Ser | Tyr | Glu | Glu | Leu | Ala | Glu | Ile | Thr | 355 | 360 | 365 |
| Gln | Gly | Phe | Ala | Arg | Lys | Asn | Ile | Leu | Gly | Glu | Gly | Gly | Phe | Gly | Cys | 370 | 375 | 380 |
| Val | Tyr | Lys | Gly | Thr | Leu | Gln | Asp | Gly | Lys | Val | Val | Ala | Val | Lys | Gln | 385 | 390 | 395 |
| Leu | Lys | Ala | Gly | Ser | Gly | Gln | Gly | Asp | Arg | Glu | Phe | Lys | Ala | Glu | Val | 405 | 410 | 415 |
| Glu | Ile | Ile | Ser | Arg | Val | His | His | Arg | His | Leu | Val | Ser | Leu | Val | Gly | 420 | 425 | 430 |
| Tyr | Cys | Ile | Ser | Asp | Gln | His | Arg | Leu | Leu | Ile | Tyr | Glu | Tyr | Val | Ser | 435 | 440 | 445 |
| Asn | Gln | Thr | Leu | Glu | His | His | Leu | His | Glu | Trp | Ser | Lys | Arg | Val | Arg | 450 | 455 | 460 |
| Ile | Ala | Ile | Gly | Ser | Ala | Lys | Gly | Leu | Ala | Tyr | Leu | His | Glu | Asp | Cys | 465 | 470 | 475 |
| His | Pro | Lys | Ile | Ile | His | Arg | Asp | Ile | Lys | Ser | Ala | Asn | Ile | Leu | Leu | 485 | 490 | 495 |
| Asp | Asp | Glu | Tyr | Glu | Ala | Gln | Ala | Ile | Met | Lys | Ser | Ser | Phe | Ser | Leu | 500 | 505 | 510 |
| Asn | Leu | Ser | Tyr | Asp | Cys | Lys | Val | Leu | Val | Ala | Asp | Phe | Gly | Leu | Ala | 515 | 520 | 525 |
| Arg | Leu | Asn | Asp | Thr | Thr | Gln | Thr | His | Val | Ser | Thr | Arg | Val | Met | Gly | 530 | 535 | 540 |
| Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ser | Ser | Gly | Lys | Leu | Thr | 545 | 550 | 555 |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Arg | Ser | Asp | Val | Phe | Ser | Phe | Gly | Val | Val | Leu | Leu | Glu | Leu | Val |
| | | | | 565 | | | | | 570 | | | | | 575 | |
| Thr | Gly | Arg | Lys | Pro | Val | Asp | Gln | Thr | Gln | Pro | Leu | Gly | Glu | Glu | Ser |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Leu | Val | Glu | Trp | Ala | Arg | Pro | Leu | Leu | Leu | Lys | Ala | Ile | Glu | Thr | Gly |
| | | 595 | | | | | 600 | | | | | 605 | | | |
| Asp | Leu | Ser | Glu | Leu | Ile | Asp | Thr | Arg | Leu | Glu | Lys | Arg | Tyr | Val | Glu |
| | 610 | | | | | 615 | | | | | 620 | | | | |
| His | Glu | Val | Phe | Arg | Met | Ile | Glu | Thr | Ala | Ala | Ala | Cys | Val | Arg | His |
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| Ser | Gly | Pro | Lys | Arg | Pro | Arg | Met | Val | Gln | Val | Val | Arg | Ala | Leu | Asp |
| | | | | 645 | | | | | 650 | | | | | 655 | |
| Cys | Asp | Gly | Asp | Ser | Gly | Asp | Ile | Ser | Asn | Gly | Ile | Lys | Ile | Gly | Gln |
| | | | 660 | | | | | 665 | | | | | 670 | | |
| Ser | Thr | Thr | Tyr | Asp | Ser | Gly | Gln | Tyr | Asn | Glu | Asp | Ile | Met | Lys | Phe |
| | | 675 | | | | | 680 | | | | | 685 | | | |
| Arg | Lys | Met | Ala | Phe | Gly | Gly | Asp | Asn | Ser | Val | Glu | Ser | Gly | Leu | Tyr |
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| Ser | Gly | Asn | Tyr | Ser | Ala | Lys | Ser | Ser | Ser | Asp | Phe | Ser | Gly | Asn | Glu |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
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<211> 1939

<212> DNA

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| ctccttctcc | tacacctcct | caaggagact | catcatcctc | gccacctcct | gattccacat | 180 |
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| cgtcacaggg | cggtggagga | gaaagaggaa | atggaggaaa | caatgggtggc | aatgatactc | 300 |
| caccgtcacg | cggctctcct | ccttctcctc | cttctaggag | taatggagat | aatgggtggt | 360 |
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| tcc | gat | gtt | ttc | tct | tac | gga | gtt | atg | tta | ttg | gaa | ctt | ata | act | gga | 1440 |
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| Lys | Arg | Lys | Asp | Ser | Phe | Tyr | Pro | Glu | Pro | Met | Lys | Gly | Asn | Gln | Tyr | |
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| Gln | Tyr | Tyr | Gly | Asn | Asn | Asn | Asn | Asn | Asn | Ala | Ser | Gln | Asn | Tyr | Pro | |
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| Ser Ser Ser Gly Leu Leu Leu Leu Leu Ala Val Cys Ile Cys Ile Cys | |
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| tat Tyr 225 | tac Tyr | aag Lys | gga Gly | aca Thr | cct Pro 230 | caa Gln | gat Asp | cat His | gtg Val | gtg Val 235 | aat Asn | atg Met | gct Ala | ggt Gly | caa Gln 240 | 720 |
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| att Ile 290 | gca Ala | aca Thr | gaa Glu | ggt Gly | ttc Phe | gct Ala 295 | cag Gln | tca Ser | aat Asn | ttg Leu | cta Leu 300 | gga Gly | caa Gln | gga Gly | gga Gly | 912 |
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| ctt Leu | gtt Val | gga Gly 355 | tat Tyr | tgc Cys | atc Ile | tct Ser | ggt Gly 360 | ggt Gly | caa Gln | aga Arg | ctt Leu 365 | ttg Leu | gtt Val | tat Tyr | gag Glu | 1104 |
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| gca | aac | att | ctt | ctt | gat | ttc | agt | ttt | gag | acc | aag | gtg | gca | gat | ttt | 1344 |
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| gga | ttg | gct | aag | cta | tct | caa | gac | aac | tat | act | cat | gtc | tcc | act | cgc | 1392 |
| Gly | Leu | Ala | Lys | Leu | Ser | Gln | Asp | Asn | Tyr | Thr | His | Val | Ser | Thr | Arg | |
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| gtc | atg | gga | act | ttt | gga | tac | tta | gct | cca | gag | tat | gca | tca | agc | gga | 1440 |
| Val | Met | Gly | Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ser | Ser | Gly | |
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| Ile | Pro | Leu | Val | Gly | Ser | Ile | Ile | Val | Arg | Ala | Leu | Glu | Gly | Asp | Met | |
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| tca | atg | gat | gat | cta | agt | gag | gga | aca | aga | cca | gga | caa | agc | acg | tac | 1824 |
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| ttg | agc | ccc | ggg | agc | gtg | agc | tca | gag | tat | gac | gca | agc | tcg | tac | acg | 1872 |
| Leu | Ser | Pro | Gly | Ser | Val | Ser | Ser | Glu | Tyr | Asp | Ala | Ser | Ser | Tyr | Thr | |
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| Ala | Asp | Met | Lys | Lys | Phe | Lys | Lys | Leu | Ala | Leu | Glu | Asn | Lys | Glu | Tyr | |
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| | |
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| Tyr | Tyr | Lys | Gly | Thr | Pro | Gln | Asp | His | Val | Val | Asn | Met | Ala | Gly | Gln |
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| Gly | Gly | Gly | Asn | Trp | Gly | Pro | Gln | Gln | Pro | Val | Ser | Gly | Pro | His | Ser |
| | | | | 245 | | | | | 250 | | | | | 255 | |
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| | | | | | | | | | | | | | | | |
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| Ala | Thr | Leu | Gly | His | Asn | Gln | Ser | Thr | Phe | Thr | Tyr | Asp | Glu | Leu | Ser |
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| Ile | Ala | Thr | Glu | Gly | Phe | Ala | Gln | Ser | Asn | Leu | Leu | Gly | Gln | Gly | Gly |
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| Phe | Gly | Tyr | Val | His | Lys | Gly | Val | Leu | Pro | Ser | Gly | Lys | Glu | Val | Ala |
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| Leu | Val | Gly | Tyr | Cys | Ile | Ser | Gly | Gly | Gln | Arg | Leu | Leu | Val | Tyr | Glu |
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| Phe | Ile | Pro | Asn | Asn | Thr | Leu | Glu | Phe | His | Leu | His | Gly | Lys | Gly | Arg |
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| Gly | Leu | Ala | Lys | Leu | Ser | Gln | Asp | Asn | Tyr | Thr | His | Val | Ser | Thr | Arg |
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| Val | Met | Gly | Thr | Phe | Gly | Tyr | Leu | Ala | Pro | Glu | Tyr | Ala | Ser | Ser | Gly |
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| ctactaatte | tgttaggtct | tctctttgtc | ttctacagag | ctaccagaaa | tagaaataac | 960 |
| aacagcagct | ctgctcatca | tcaatccaaa | actccctcaa | aagttcaaca | tcacgggggc | 1020 |
| ggtaatgctg | gtacgaacca | ggcacatggt | atcacaatgc | caccaccaat | ccatgctaaa | 1080 |
| tatatatcta | gtggaggttg | tgatacgaag | gagaacaatt | ctgttgcgaa | aaacatttca | 1140 |
| atgccatctg | gaatgttctc | ctacgaagaa | ctttcaaaag | caactgggtg | attttcagag | 1200 |
| gagaaccttt | tgggagaagg | cggtttcgga | tatgttcaca | aaggagtgtt | gaaaaacggg | 1260 |
| tcagaagtgg | cgggtgaagca | gctgaagatt | gggagctatc | aaggggaaag | agaattccaa | 1320 |
| gctgaggttg | acacaatcag | tagggttcat | cataagcacc | tcgtttcatt | ggttgggttat | 1380 |
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| ttccacttgc | atgagaacag | aggaagcgtg | ttggaatggg | aatgaggct | caggattgct | 1500 |
| gtaggagcag | caaaaggatt | agcttatctt | catgaggatt | gcagtccaac | tataattcac | 1560 |
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| tttggaactag | ccaagttttt | ctcagacacc | aattcatcat | tcactcatat | ctctactcga | 1680 |
| gtggtaggaa | ctttcggata | catggctcca | gaatacgcgt | ccagtggtaa | agtaactgat | 1740 |
| aatcagatg | tatattcctt | tggggtcgtg | cttctagaac | tcactactgg | acgtccatca | 1800 |
| attttcgcca | aagattcttc | cacaaaccag | agtttagtag | actgggagag | gccattgctt | 1860 |
| acgaaagcaa | tctctggaga | aagttttgac | tttctttagtag | actcaagggt | ggagaagaat | 1920 |
| tacgatacaa | ctcagatggc | aaacatggct | gcttgtgctg | ctgcttgcat | acgccaatca | 1980 |
| gcttggtctc | ggcctagaat | gagccaggta | gtacgtgctc | ttgaaggcga | ggtggccctg | 2040 |
| agaaaggctc | aagagactgg | gaatagcgtg | acctatagct | cttctgaaaa | cccgaatgac | 2100 |
| atcacaccac | ggtatggaac | aaataagagg | agattcgaca | caggttcaag | cgatgggttac | 2160 |
| acttcagaat | atggagttaa | cccttctcag | tcgagcagtg | aacatcaaca | ggtgaatact | 2220 |
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| Ala Met Ser Leu Pro Pro Ala Asp Ser Val Pro Asp Thr Ser Ser Pro | |
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| cca gct cct cct ttg tct cct ctt ccc cca cca ttg agc tct cct ccg | 144 |
| Pro Ala Pro Pro Leu Ser Pro Leu Pro Pro Pro Leu Ser Ser Pro Pro | |
| 35 40 45 | |
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| Pro Leu Pro Ser Pro Pro Pro Leu Ser Ala Pro Thr Ala Ser Pro Pro | |
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| 65 70 75 80 | |
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| Pro Pro Leu Leu Glu Ser Pro Pro Pro Pro Pro Leu Glu Ser Pro Ser | |
| 85 90 95 | |
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| Pro Pro Ser Pro His Val Ser Ala Pro Ser Gly Ser Pro Pro Leu Pro | |
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| Phe Leu Pro Ala Lys Pro Ser Pro Pro Ser Ser Ser Pro Pro Ser Glu | |
| 115 120 125 | |
| aca gtt ccg ccg gga aat acg att tct cca cca cct cgt tca ctt ccc | 432 |
| Thr Val Pro Pro Gly Asn Thr Ile Ser Pro Pro Pro Arg Ser Leu Pro | |
| 130 135 140 | |
| tcc gaa tca acc ccg ccg gtg aac aca gct tct cct cca ccg cca tct | 480 |
| Ser Glu Ser Thr Pro Pro Val Asn Thr Ala Ser Pro Pro Pro Pro Ser | |
| 145 150 155 160 | |
| cct cct cgc cgc cgt agt ggc cct aag cct tcg ttt cct cct ccc atc | 528 |
| Pro Pro Arg Arg Arg Ser Gly Pro Lys Pro Ser Phe Pro Pro Pro Ile | |
| 165 170 175 | |
| aat tct tct cca cca aat cct tct ccg aac act ccg tca ctc cca gaa | 576 |
| Asn Ser Ser Pro Pro Asn Pro Ser Pro Asn Thr Pro Ser Leu Pro Glu | |
| 180 185 190 | |
| cct tct cct cca cct aaa cca ccg ctc tca acg acg cca ttt ccc tcc | 624 |
| Thr Ser Pro Pro Pro Lys Pro Pro Leu Ser Thr Thr Pro Phe Pro Ser | |
| 195 200 205 | |

| | | | | | | | | | | | | | | | | |
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| tca Ser 210 | tcc Ser 210 | act Thr | ccc Pro | ccg Pro | cct Pro | aag Lys 215 | aag Lys 215 | tcc Ser | cct Pro | gca Ala 220 | gca Ala 220 | gta Val | act Thr | ctt Leu | cct Pro | 672 |
| ttc Phe 225 | ttt Phe 225 | ggg Gly | cca Pro | gcg Ala | ggc Gly 230 | caa Gln 235 | tta Leu 235 | ccg Pro | gat Asp 235 | ggg Gly 235 | acc Thr | gta Val | gca Ala | cct Pro | cct Pro 240 | 720 |
| att Ile | ggg Gly | cct Pro | gtt Val | ata Ile 245 | gag Glu | ccc Pro | aag Lys | acg Thr 250 | agt Ser 250 | cca Pro | gcc Ala | gaa Glu | tca Ser 255 | ata Ile 255 | tct Ser | 768 |
| ccg Pro | gga Gly | acg Thr | cca Pro 260 | cag Gln | cca Pro | ctg Leu | gtt Val | ccg Pro 265 | aag Lys | agt Ser | cta Leu | cct Pro | gta Val 270 | acg Thr | acg Thr | 816 |
| tcg Ser | tat Tyr | cac His 275 | cga Arg | tca Ser | tcc Ser | gcc Ala 280 | gga Gly 280 | ttc Phe | tta Leu | ttt Phe | ggc Gly 285 | ggg Gly 285 | gta Val | atc Ile | gtt Val | 864 |
| gga Gly 290 | gct Ala | ctt Leu | cta Leu | cta Leu | att Ile | ctg Leu 295 | tta Leu | ggg Gly | ctt Leu | ctc Leu | ttt Phe 300 | gtc Val | ttc Phe | tac Tyr | aga Arg | 912 |
| gct Ala 305 | acc Thr | aga Arg | aat Asn | aga Arg | aat Asn 310 | aac Asn | aac Asn | agc Ser | agc Ser | tct Ser 315 | gct Ala | cat His | cat His | caa Gln | tcc Ser 320 | 960 |
| aaa Lys | act Thr | ccc Pro | tca Ser 325 | aaa Lys | gtt Val | caa Gln | cat His | cat His | cgg Arg 330 | ggc Gly | ggg Gly | aat Asn | gct Ala | ggg Gly 335 | acg Thr | 1008 |
| aac Asn | cag Gln | gca Ala | cat His 340 | gtt Val | atc Ile | aca Thr | atg Met | cca Pro 345 | cca Pro | cca Pro | atc Ile | cat His | gct Ala 350 | aaa Lys | tat Tyr | 1056 |
| ata Ile | tct Ser | agt Ser 355 | gga Gly | ggg Gly | tgt Cys | gat Asp 360 | acg Thr | aag Lys | gag Glu | aac Asn | aat Asn | tct Ser 365 | gtt Val | gcg Ala | aaa Lys | 1104 |
| aac Asn 370 | att Ile | tca Ser | atg Met | cca Pro | tct Ser | gga Gly 375 | atg Met | ttc Phe | tcc Ser | tac Tyr | gaa Glu 380 | gaa Glu | ctt Leu | tca Ser | aaa Lys | 1152 |
| gca Ala 385 | act Thr | ggg Gly | gga Gly | ttt Phe | tca Ser 390 | gag Glu | gag Glu | aac Asn | ctt Leu | ttg Leu 395 | gga Gly | gaa Glu | ggc Gly | ggg Gly | ttc Phe 400 | 1200 |
| gga Gly | tat Tyr | gtt Val | cac His | aaa Lys 405 | gga Gly | gtg Val | ttg Leu | aaa Lys | aac Asn 410 | ggg Gly | aca Thr | gaa Glu | gtt Val | gcg Ala 415 | gtg Val | 1248 |
| aag Lys | cag Gln | ctg Leu | aag Lys | att Ile | ggg Gly | agc Ser | tat Tyr | caa Gln | ggg Gly | gaa Glu | aga Arg | gaa Glu | ttc Phe | caa Gln | gct Ala | 1296 |

| 420 | | | | | | 425 | | | | | | 430 | | | | | | |
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| gag | ggt | gac | aca | atc | agt | agg | ggt | cat | cat | aag | cac | ctc | ggt | tca | ttg | 1344 | | |
| Glu | Val | Asp | Thr | Ile | Ser | Arg | Val | His | His | Lys | His | Leu | Val | Ser | Leu | | | |
| 435 | | | | | | 440 | | | | | | 445 | | | | | | |
| ggt | ggt | tat | tgc | ggt | aat | gga | gat | aaa | aga | ctc | ttg | ggt | tac | gag | ttt | 1392 | | |
| Val | Gly | Tyr | Cys | Val | Asn | Gly | Asp | Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | | | |
| 450 | | | | | | 455 | | | | | | 460 | | | | | | |
| ggt | cct | aaa | gat | acc | ttg | gag | ttc | cac | ttg | cat | gag | aac | aga | gga | agc | 1440 | | |
| Val | Pro | Lys | Asp | Thr | Leu | Glu | Phe | His | Leu | His | Glu | Asn | Arg | Gly | Ser | | | |
| 465 | | | | | | 470 | | | | | | 475 | | | | 480 | | |
| gtg | ttg | gaa | tgg | gaa | atg | agg | ctc | agg | att | gct | gta | gga | gca | gca | aaa | 1488 | | |
| Val | Leu | Glu | Trp | Glu | Met | Arg | Leu | Arg | Ile | Ala | Val | Gly | Ala | Ala | Lys | | | |
| 485 | | | | | | 490 | | | | | | 495 | | | | | | |
| gga | tta | gct | tat | ctt | cat | gag | gat | tgc | agt | cca | act | ata | att | cac | cgt | 1536 | | |
| Gly | Leu | Ala | Tyr | Leu | His | Glu | Asp | Cys | Ser | Pro | Thr | Ile | Ile | His | Arg | | | |
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| gat | atc | aaa | gca | gct | aat | atc | ctt | cta | gat | tcc | aaa | ttt | gag | gca | aag | 1584 | | |
| Asp | Ile | Lys | Ala | Ala | Asn | Ile | Leu | Leu | Asp | Ser | Lys | Phe | Glu | Ala | Lys | | | |
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| gtc | tct | gac | ttt | gga | cta | gcc | aag | ttt | ttc | tca | gac | acc | aat | tca | tca | 1632 | | |
| Val | Ser | Asp | Phe | Gly | Leu | Ala | Lys | Phe | Phe | Ser | Asp | Thr | Asn | Ser | Ser | | | |
| 530 | | | | | | 535 | | | | | | 540 | | | | | | |
| ttc | act | cat | atc | tct | act | cga | gtg | gta | gga | act | ttc | gga | tac | atg | gct | 1680 | | |
| Phe | Thr | His | Ile | Ser | Thr | Arg | Val | Val | Gly | Thr | Phe | Gly | Tyr | Met | Ala | | | |
| 545 | | | | | | 550 | | | | | | 555 | | | | 560 | | |
| cca | gaa | tac | gcg | tcc | agt | ggg | aaa | gta | act | gat | aaa | tca | gat | gta | tat | 1728 | | |
| Pro | Glu | Tyr | Ala | Ser | Ser | Gly | Lys | Val | Thr | Asp | Lys | Ser | Asp | Val | Tyr | | | |
| 565 | | | | | | 570 | | | | | | 575 | | | | | | |
| tcc | ttt | ggg | gtc | gtg | ctt | cta | gaa | ctc | atc | act | gga | cgt | cca | tca | att | 1776 | | |
| Ser | Phe | Gly | Val | Val | Leu | Leu | Glu | Leu | Ile | Thr | Gly | Arg | Pro | Ser | Ile | | | |
| 580 | | | | | | 585 | | | | | | 590 | | | | | | |
| ttc | gcc | aaa | gat | tct | tcc | aca | aac | cag | agt | tta | gta | gac | tgg | gcg | agg | 1824 | | |
| Phe | Ala | Lys | Asp | Ser | Ser | Thr | Asn | Gln | Ser | Leu | Val | Asp | Trp | Ala | Arg | | | |
| 595 | | | | | | 600 | | | | | | 605 | | | | | | |
| cca | ttg | ctt | acg | aaa | gca | atc | tct | gga | gaa | agt | ttt | gac | ttt | ctt | gta | 1872 | | |
| Pro | Leu | Leu | Thr | Lys | Ala | Ile | Ser | Gly | Glu | Ser | Phe | Asp | Phe | Leu | Val | | | |
| 610 | | | | | | 615 | | | | | | 620 | | | | | | |
| gac | tca | agg | ttg | gag | aag | aat | tac | gat | aca | act | cag | atg | gca | aac | atg | 1920 | | |
| Asp | Ser | Arg | Leu | Glu | Lys | Asn | Tyr | Asp | Thr | Thr | Gln | Met | Ala | Asn | Met | | | |
| 625 | | | | | | 630 | | | | | | 635 | | | | 640 | | |

| | |
|---|------|
| gct gct tgt gct gct gct tgc ata cgc caa tca gct tgg ctt cgg cct | 1968 |
| Ala Ala Cys Ala Ala Ala Cys Ile Arg Gln Ser Ala Trp Leu Arg Pro | |
| 645 650 655 | |
| aga atg agc cag gta gta cgt gct ctt gaa ggc gag gtg gcc ctg aga | 2016 |
| Arg Met Ser Gln Val Val Arg Ala Leu Glu Gly Glu Val Ala Leu Arg | |
| 660 665 670 | |
| aag gtc gaa gag act ggg aat agc gtg acc tat agc tct tct gaa aac | 2064 |
| Lys Val Glu Glu Thr Gly Asn Ser Val Thr Tyr Ser Ser Ser Glu Asn | |
| 675 680 685 | |
| ccg aat gac atc aca cca cgg tat gga aca aat aag agg aga ttc gac | 2112 |
| Pro Asn Asp Ile Thr Pro Arg Tyr Gly Thr Asn Lys Arg Arg Phe Asp | |
| 690 695 700 | |
| aca ggt tca agc gat ggt tac act tca gaa tat gga gtt aac cct tct | 2160 |
| Thr Gly Ser Ser Asp Gly Tyr Thr Ser Glu Tyr Gly Val Asn Pro Ser | |
| 705 710 715 720 | |
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| 20 25 30 | |
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| Pro Leu Pro Ser Pro Pro Pro Leu Ser Ala Pro Thr Ala Ser Pro Pro | |
| 50 55 60 | |
| Pro Leu Pro Val Glu Ser Pro Pro Ser Pro Pro Ile Glu Ser Pro Pro | |
| 65 70 75 80 | |
| Pro Pro Leu Leu Glu Ser Pro Pro Pro Pro Pro Leu Glu Ser Pro Ser | |
| 85 90 95 | |
| Pro Pro Ser Pro His Val Ser Ala Pro Ser Gly Ser Pro Pro Leu Pro | |
| 100 105 110 | |
| Phe Leu Pro Ala Lys Pro Ser Pro Pro Pro Ser Ser Pro Pro Ser Glu | |
| 115 120 125 | |
| Thr Val Pro Pro Gly Asn Thr Ile Ser Pro Pro Pro Arg Ser Leu Pro | |
| 130 135 140 | |
| Ser Glu Ser Thr Pro Pro Val Asn Thr Ala Ser Pro Pro Pro Pro Ser | |
| 145 150 155 160 | |
| Pro Pro Arg Arg Arg Ser Gly Pro Lys Pro Ser Phe Pro Pro Pro Ile | |
| 165 170 175 | |
| Asn Ser Ser Pro Pro Asn Pro Ser Pro Asn Thr Pro Ser Leu Pro Glu | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Thr | Ser | Pro | Pro | Pro | Lys | Pro | Pro | Leu | Ser | Thr | Thr | Pro | Phe | Pro | Ser | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ser | Ser | Thr | Pro | Pro | Pro | Lys | Lys | Ser | Pro | Ala | Ala | Val | Thr | Leu | Pro | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Phe | Phe | Gly | Pro | Ala | Gly | Gln | Leu | Pro | Asp | Gly | Thr | Val | Ala | Pro | Pro | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Ile | Gly | Pro | Val | Ile | Glu | Pro | Lys | Thr | Ser | Pro | Ala | Glu | Ser | Ile | Ser | |
| | | | 245 | | | | | | 250 | | | | | 255 | | |
| Pro | Gly | Thr | Pro | Gln | Pro | Leu | Val | Pro | Lys | Ser | Leu | Pro | Val | Thr | Thr | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Ser | Tyr | His | Arg | Ser | Ser | Ala | Gly | Phe | Leu | Phe | Gly | Gly | Val | Ile | Val | |
| | | 275 | | | | | 280 | | | | | 285 | | | | |
| Gly | Ala | Leu | Leu | Leu | Ile | Leu | Leu | Gly | Leu | Leu | Phe | Val | Phe | Tyr | Arg | |
| | 290 | | | | | 295 | | | | | 300 | | | | | |
| Ala | Thr | Arg | Asn | Arg | Asn | Asn | Asn | Ser | Ser | Ser | Ala | His | His | Gln | Ser | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Lys | Thr | Pro | Ser | Lys | Val | Gln | His | His | Arg | Gly | Gly | Asn | Ala | Gly | Thr | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Asn | Gln | Ala | His | Val | Ile | Thr | Met | Pro | Pro | Pro | Ile | His | Ala | Lys | Tyr | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Ile | Ser | Ser | Gly | Gly | Cys | Asp | Thr | Lys | Glu | Asn | Asn | Ser | Val | Ala | Lys | |
| | | 355 | | | | 360 | | | | | | 365 | | | | |
| Asn | Ile | Ser | Met | Pro | Ser | Gly | Met | Phe | Ser | Tyr | Glu | Glu | Leu | Ser | Lys | |
| | 370 | | | | | 375 | | | | | 380 | | | | | |
| Ala | Thr | Gly | Gly | Phe | Ser | Glu | Glu | Asn | Leu | Leu | Gly | Glu | Gly | Gly | Phe | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | |
| Gly | Tyr | Val | His | Lys | Gly | Val | Leu | Lys | Asn | Gly | Thr | Glu | Val | Ala | Val | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| Lys | Gln | Leu | Lys | Ile | Gly | Ser | Tyr | Gln | Gly | Glu | Arg | Glu | Phe | Gln | Ala | |
| | | | 420 | | | | | 425 | | | | | 430 | | | |
| Glu | Val | Asp | Thr | Ile | Ser | Arg | Val | His | His | Lys | His | Leu | Val | Ser | Leu | |
| | | 435 | | | | 440 | | | | | | 445 | | | | |
| Val | Gly | Tyr | Cys | Val | Asn | Gly | Asp | Lys | Arg | Leu | Leu | Val | Tyr | Glu | Phe | |
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| Val | Pro | Lys | Asp | Thr | Leu | Glu | Phe | His | Leu | His | Glu | Asn | Arg | Gly | Ser | |
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| Val | Leu | Glu | Trp | Glu | Met | Arg | Leu | Arg | Ile | Ala | Val | Gly | Ala | Ala | Lys | |
| | | | | 485 | | | | | 490 | | | | | 495 | | |
| Gly | Leu | Ala | Tyr | Leu | His | Glu | Asp | Cys | Ser | Pro | Thr | Ile | Ile | His | Arg | |
| | | | 500 | | | | | 505 | | | | | 510 | | | |
| Asp | Ile | Lys | Ala | Ala | Asn | Ile | Leu | Leu | Asp | Ser | Lys | Phe | Glu | Ala | Lys | |
| | | 515 | | | | | 520 | | | | | 525 | | | | |
| Al | Ser | Asp | Phe | Gly | Leu | Ala | Lys | Phe | Phe | Ser | Asp | Thr | Asn | Ser | Ser | |
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| Phe | Thr | His | Ile | Ser | Thr | Arg | Val | Val | Gly | Thr | Phe | Gly | Tyr | Met | Ala | |
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| Pro | Glu | Tyr | Ala | Ser | Ser | Gly | Lys | Val | Thr | Asp | Lys | Ser | Asp | Val | Tyr | |
| | | | | 565 | | | | | 570 | | | | | 575 | | |
| Ser | Phe | Gly | Val | Val | Leu | Leu | Glu | Leu | Ile | Thr | Gly | Arg | Pro | Ser | Ile | |
| | | | 580 | | | | | 585 | | | | | 590 | | | |
| Phe | Ala | Lys | Asp | Ser | Ser | Thr | Asn | Gln | Ser | Leu | Val | Asp | Trp | Ala | Arg | |
| | | 595 | | | | | 600 | | | | | 605 | | | | |
| Pro | Leu | Leu | Thr | Lys | Ala | Ile | Ser | Gly | Glu | Ser | Phe | Asp | Phe | Leu | Val | |

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| 610 | 615 | 620 |
| Asp Ser Arg Leu Glu Lys Asn Tyr Asp Thr Thr Gln Met Ala Asn Met | | |
| 625 | 630 | 635 |
| Ala Ala Cys Ala Ala Ala Cys Ile Arg Gln Ser Ala Trp Leu Arg Pro | | 640 |
| | 645 | 650 |
| Arg Met Ser Gln Val Val Arg Ala Leu Glu Gly Glu Val Ala Leu Arg | | 655 |
| | 660 | 665 |
| Lys Val Glu Glu Thr Gly Asn Ser Val Thr Tyr Ser Ser Ser Glu Asn | | 670 |
| | 675 | 680 |
| Pro Asn Asp Ile Thr Pro Arg Tyr Gly Thr Asn Lys Arg Arg Phe Asp | | 685 |
| | 690 | 695 |
| Thr Gly Ser Ser Asp Gly Tyr Thr Ser Glu Tyr Gly Val Asn Pro Ser | | 700 |
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27

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<223> Description of Artificial Sequence: primer

<220>
<221> misc_feature
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=A/g N(8) =I N(9) =A/g N(10) =A/g

<400> 23
annannttng cnannccnaa ntc

23

<210> 24
<211> 8
<212> PRT
<213> Arabidopsis thaliana

<400> 24
Asp Phe Gly Leu Ala Lys Leu Leu
1 5

<210> 25
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 25
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18

<210> 26
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

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27

<210> 27
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer

<400> 27
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30